CLAIMS LISTING

1. (Previously Presented) A leak detection instrument for monitoring gas leakage from a device, comprising:

   a. an instrument housing;

   b. a gas sensor supported relative to said instrument housing and operative upon exposure to a selected gas to generate a corresponding gas detection input signal;

   c. a gas pump disposed within said instrument housing and operative upon actuation to draw the selected gas toward said gas sensor;

   d. an acoustic emissions (AE) sensor supported relative to said instrument housing and operative upon exposure to sound attendant with leakage of the selected gas to generate a corresponding sound detection input signal;

   e. processing circuitry for receiving said gas detection input signal and said sound detection input signal and for producing at least one output signal in response thereto; and

   f. an output device for producing perceptible output in response to said output signal.

2. (Original) A leak detection instrument according to claim 1 wherein said gas sensor is a chemical properties leak detector (CPLD).

3. (Original) A leak detection instrument detector according to claim 1 wherein said gas sensor is selected from a group consisting of a chemical properties leak detector (CPLD), a thermal conductivity detector (TCD), a photo-ionization detector (PID), a laser

interferometer (LID), a corona discharge detector (CDD), a microelectromechanical (MEMS) based detector, a chemical resistor sensor (CRS), and a surface acoustic wave (SAW) detector.

4. (Canceled)

5. (Previously Presented) A leak detection instrument according to claim 1 wherein said AE sensor is supported relative to said instrument housing by an AE sensor mounting assembly.

6. (Original) A leak detection instrument according to claim 1 wherein said AE sensor is supported relative to said instrument housing by an AE sensor mounting assembly.

7. (Original) A leak detection instrument according to claim 5 wherein said AE sensor mounting assembly includes an elongated tubular extension having a proximal end removably attached to said instrument housing and extending from said proximal end to terminate at a distal end, and including an AE sensor housing disposed on said distal end.

8. (Original) A leak detection instrument according to claim 7 wherein said gas sensor is disposed within said instrument housing upstream of said pump, and wherein said tubular extension is a flexible member defining an airflow passageway between said AE sensor and said gas sensor.

9. (Original) A leak detection instrument according to claim 8 including a filter interposed between said AE sensor and said gas sensor.

10. (Original) A leak detection instrument according to claim 9 including a vacuum switch operative to monitor said filter and to produce a blocked filter indicator (BFI) signal for processing by said processing circuitry when said filter becomes contaminated and its efficacy reduced.

11. (Original) A leak detection instrument according to claim 8 wherein said pump is operative upon actuation to draw the target gas from an upstream end of said AE sensor mounting assembly, in a downstream direction along the airflow passageway, and toward said gas sensor.

12. (Previously Presented) A leak detection instrument according to claim 7 wherein said AE sensor is a microphonic element supported within an interior of said AE sensor housing in electrical communication with said processing circuitry.

13. (Original) A leak detection instrument according to claim 12 including a plurality of LEDs supported within said AE sensor housing in electrical communication with said processing circuitry.

14. (Original) A leak detection instrument according to claim 13 wherein said AE sensor and said LEDs are mounted on a common circuit board.

15. (Original) A leak detection instrument according to claim 1 wherein said processing circuitry is operative to parallel process said gas detection input signal and said sound detection input signal.

16. (Original) A leak detection instrument according to claim 1 wherein said processing circuitry includes at least one processing

component selected from a group consisting of a microprocessor, a microcontroller and a digital signal processor (DSP).

17. (Currently Amended) An acoustic emissions (AE) sensor mounting assembly adapted for connection to a scientific instrument that includes an instrument housing, processing circuitry for receiving an input sound detection signal and producing an output signal in response thereto, and an output device for generating perceptible output in response to the output signal, said AE sensor mounting assembly comprising:

a. a mounting member formed as an elongated, tubular extension that is adapted to releaseably connect to the instrument housing, said mounting member formed to include a gas flow passageway between respective ends thereof;

b. an AE sensor housing supported by said mounting member, said AE sensor housing including a pair of bored end caps joined together to substantially surround an AE sensor housing interior, and a through bore in communication with the gas flow passageway; ~~and~~

c. an AE sensor disposed within said AE sensor housing and adapted to be placed in electrical communication with said processing circuitry, said AE sensor being a micro-phonic element mounted on a circuit board that is supported within the AE sensor housing interior, said AE sensor operative upon exposure to sound attendant with gas leakage from a device to generate the input sound detection signal for processing~~.~~; and

d. a plurality of ultraviolet LEDs mounted on said circuit board, said ultraviolet LEDs operative upon emission of ultraviolet light to cause an appropriately dyed target gas, or its residue, in a vicinity of said AE sensor housing to fluoresce.

18. (Original) An AE sensor mounting assembly according to claim 17 wherein said elongated mounting member is a flexible tube having a proximal end releaseably connected to the instrument housing and extending from said proximal end to terminate at a distal end, said AE sensor housing supported on said distal end.

19. (Original) An AE sensor mounting assembly according to claim 17 wherein said AE sensor housing is releaseably connected to said mounting member.

20. Canceled.

21. Canceled.

22. (Currently Amended) An AE sensor mounting assembly according to claim ~~21~~ 17 wherein a downstream one of said end caps is removably attached to said mounting member, and wherein an upstream one of said end caps receives said AE sensor.

23. Canceled.

24. Canceled.

25. (Currently Amended) An AE sensor mounting assembly according to claim ~~24~~ 17 including at least one photo detector mounted on said circuit board and adapted to be placed in electrical communication with said processing circuitry, said photo detector

being responsive to fluorescent light caused by said emission of ultraviolet light to generate a photo detection signal for processing.

26. (Currently Amended) An AE sensor mounting assembly according to claim ~~24—~~17 wherein said microphonic element and said ultraviolet LEDs are mounted on a first surface of said circuit board and project forwardly in an upstream direction, and wherein an upstream one of said end caps includes a central bore that is directionally aligned with said microphonic element, and a plurality of radially offset bores each axially aligned with a respective one of said ultraviolet LEDs, and including at least one visible LED mounted on said circuit board for emitting visible light upon emission of ultraviolet light from said ultraviolet LEDs, thereby to indicate an on state for the ultraviolet LEDs.

27. (Original) An AE sensor mounting assembly according to claim 26 including a plurality of visible LEDs mounted on an opposite second surface of said circuit board and adapted to be placed in electrical communication with said processing circuitry, said visible LEDs operative upon emission of visible light to illuminate an area in a vicinity of said AE sensor housing.

28. (Previously Presented) An AE sensor mounting assembly according to claim 27 wherein said LEDs are equiangularly distributed about said microphonic element.

29. (Currently Amended) An AE sensor mounting assembly according to claim ~~24~~ 17 including a plurality of visible LEDs mounted on said circuit board and adapted to be placed in electrical communication

with said processing circuitry, said visible LEDs operative upon emission of visible light to illuminate an area in a vicinity of said AE sensor housing.

30. (Original) An AE sensor mounting assembly according to claim 29 including a light transmissive annular ring sandwiched between said end caps in radial alignment with said visible LEDs.

31. (Previously Presented) In a leak detection instrument having an instrument housing, an acoustic emissions (AE) sensor supported relative to said instrument housing that is operative upon exposure to sound attendant with leakage from a device to produce a corresponding sound detection input signal, AE sensor processing circuitry disposed within said instrument housing for receiving the sound detection input signal and producing an AE sensor output signal in response thereto, and output circuitry for generating associated AE sensor perceptible output in response to said AE sensor output signal, the improvement comprising:

a. a gas sensor supported within the instrument housing, said gas sensor operative upon exposure to a selected gas to generate a corresponding gas detection input signal;

b. a pump supported within the instrument housing and operative upon actuation to draw air past said gas sensor; and

c. gas sensor processing circuitry in electrical communication with said gas sensor, said gas sensor processing circuitry operative in response to said gas detection input signal to generate a corresponding gas detection output signal.

32. Canceled.

33. (Original) The improvement according to claim 31 wherein said output circuitry is operative in response to said gas detection output signal to generate associated gas sensor perceptible output in response thereto.

34. (Original) The improvement according to claim 31 wherein said gas sensor is selected from a group consisting of a chemical properties leak detector (CPLD), a thermal conductivity detector (TCD), a photo-ionization detector (PID), a laser interferometer (LID), a corona discharge detector (CDD), a microelectromechanical (MEMS) based detector, a Chemical Resistor Sensor (CRS), and a surface acoustic wave (SAW) sensor.

35. Canceled.

36. Canceled.

37. Canceled.

38. Canceled.

39. (Previously Presented) A method of monitoring a device to ascertain leakage of a target gas therefrom, comprising:

a. providing a gas sensor that is operative upon exposure to the target gas to generate a corresponding gas detection input signal;

b. providing an AE sensor that is operative upon exposure to airborne sound emanating from the device that is attendant with leakage of the target gas to generate a corresponding sound detection input signal;

c. visibly illuminating an area in a vicinity of an upstream location that is in a vicinity of a suspected leak;

d. drawing the target gas along a gas flow passageway from the upstream location towards a downstream location, whereby the target gas encounters said gas sensor and said gas sensor generates said gas detection input signal;

e. exposing said AE sensor to the airborne sound whereby said AE sensor generates said sound detection input signal;

f. processing said gas detection input signal and said sound detection input signal to produce at least one output signal in response thereto; and

g. displaying perceptible output in response to said output signal.

40. (Original) A method according to claim 39 whereby said sound detection input signal and said gas detection input signal are parallel processed.

41. Canceled.

42. Canceled.

43. (Previously Presented) A method according to claim 39 including illuminating an area in a vicinity of said upstream location with ultraviolet light, thereby to cause the target gas or its residue to fluoresce.

44. (Previously Amended) A method according to claim 39 including passing the target gas through a hydrophilic filter that is interposed between said gas sensor and said AE sensor.

45. (Original) A method according to claim 44 including monitoring said hydrophilic filter in order to produce a blocked filter indication (BFI) signal for processing if efficacy of said filter is reduced below a selected threshold.

46. (Original) A method according to claim 39 whereby said gas detection input signal and said sound detection input signal are processed by at least one processing component selected from a group consisting of a microprocessor, a microcontroller and a digital signal processor (DSP).

47. (Previously Presented) A method of monitoring a device to ascertain leakage of a target gas therefrom, comprising:

a. providing a gas sensor that is operative upon exposure to the target gas to generate a corresponding gas detection input signal;

b. providing an AE sensor that is operative upon exposure to airborne sound emanating from the device that is attendant with leakage of the target gas to generate a corresponding sound detection input signal;

c. passing the target gas through a hydrophilic filter that is interposed between said gas sensor and said AE sensor;

d. exposing said gas sensor to the target gas whereby said gas sensor generates said gas detection input signal;

e. exposing said AE sensor to the airborne sound whereby said AE sensor generates said sound detection input signal;

f. processing said gas detection input signal and said sound detection input signal to produce at least one output signal in response thereto; and

g. displaying perceptible output in response to said output signal.

48. (Previously Presented) A method according to claim 47 including monitoring said hydrophilic filter in order to produce a blocked filter indication (BFI) signal for processing if efficacy of said filter is reduced below a selected threshold.

49. (Previously Presented) A method according to claim 47 whereby said gas detection input signal and said sound detection input signal are processed by at least one processing component selected from a group consisting of a microprocessor, a microcontroller and a digital signal processor (DSP).